

LIS009409175B2

(12) United States Patent

Tanaka et al.

(10) Patent No.: US 9,409,175 B2 (45) Date of Patent: Aug. 9, 2016

(54) MIXING APPARATUS

(71) Applicants: Takashige Tanaka, Kyoto (JP); Junichi Oka, Kyoto (JP); Daisuke Matsumoto, Kyoto (JP); Hitoshi Okai, Kyoto (JP)

(72) Inventors: Takashige Tanaka, Kyoto (JP); Junichi

Oka, Kyoto (JP); Daisuke Matsumoto, Kyoto (JP); Hitoshi Okai, Kyoto (JP)

(73) Assignee: ARKRAY, Inc., Kyoto-shi (JP)

(*) Notice: Subject to any disclaimer, the term of this

patent is extended or adjusted under 35

U.S.C. 154(b) by 148 days.

(21) Appl. No.: 13/771,619

(22) Filed: Feb. 20, 2013

(65) **Prior Publication Data**

US 2013/0224089 A1 Aug. 29, 2013

(30) Foreign Application Priority Data

Feb. 28, 2012 (JP) 2012-041112

(51)	Int. Cl.	
, ,	B01L 3/00	(2006.01)
	B01D 15/00	(2006.01)
	G01N 1/38	(2006.01)
	B01F 11/00	(2006.01)
	B01F 15/02	(2006.01)
	B01D 15/18	(2006.01)
	G01N 1/40	(2006.01)
		(Continued)

(52) **U.S. Cl.**

 2300/042 (2013.01); B01L 2300/047 (2013.01); B01L 2300/049 (2013.01); B01L 2300/069 (2013.01); B01L 2300/0654 (2013.01); B01L 2300/0681 (2013.01); B01L 2300/0867 (2013.01); B01L 2400/065 (2013.01); B01L 2400/0644 (2013.01); B01L 2400/0683 (2013.01); C12N 15/1017 (2013.01); G01N 1/40 (2013.01); G01N 2035/00465 (2013.01)

(58) Field of Classification Search

(56) References Cited

U.S. PATENT DOCUMENTS

8,263,024 2007/0263046			Wan et al	422/503		
200110202010		11,200.	Uehata et al	422/104		
(Continued)						

FOREIGN PATENT DOCUMENTS

JP	4053081	B2	2/2008
WO	WO-03/044488	A1	5/2003

Primary Examiner — Jennifer Wecker (74) Attorney, Agent, or Firm — Fox Rothschild LLP

(57) ABSTRACT

A mixing apparatus includes: a mixing container with a discharge port for discharging mixed liquid; a filter paper covering the discharge port to temporarily retain the liquid; a receiving unit with a waste liquid collecting portion for receiving a first liquid discharged from the discharge port through the filter paper, and a measuring portion for receiving a second liquid subjected to treatment different from treatment for the first liquid; and an operation portion for enabling selection between a first receiving state in which the waste liquid collecting portion receives the first liquid and a second receiving state in which the measuring portion receives the second liquid, and also for controlling the movement of the first liquid or the second liquid.

12 Claims, 15 Drawing Sheets

